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By Dr. Hugh Bennett

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ON

ACUTE DILATATION OF THE STOMACH.

BY C. HILTON FAGGE, M.D.

DILATATION of the stomach, independent of obstruction at the pylorus or in the small intestine, is a condition which has long been recognised. A good example of it was recorded by Andral in his 'Clinique Médicale.'¹ The patient was a woman, æt. 23, who died after thirteen months' illness, of which the principal symptom had been vomiting. The stomach was found, after death, to be very much dilated, descending to the pubes; its parietes were thin; the muscular layer very much attenuated. The records of post-mortem examinations at Guy's Hospital within the last fourteen years contain at least two similar cases, one of which was observed on August 13th, 1857, by Dr. Wilks; the other on February 19th, 1866, by Dr. Moxon. Unfortunately, clinical details as to these cases are almost completely wanting. The subject of dilatation of the stomach, apart from pyloric obstruction, is also discussed at length by Prof. Bamberger, in the 6th volume of 'Virchow's Handbuch der speciellen Pathologie und Therapie;' and a chapter is devoted to it by Dr. Wilson Fox, in the second volume of the yet unfinished 'System of Medicine' of Dr. Russell Reynolds.

Very much more frequent, however, than this affection is that in which dilatation of the stomach occurs secondarily to obstruction at the outlet of the organ, whether arising from the development of a morbid new growth in the pylorus or the contraction

¹ English translation by Dr. Spillan, 1836. p. 852.

consequent on the healing of an ulcer there or in the duodenum. That the stomach becomes enormously enlarged under such conditions is mentioned by every writer on its diseases; and, recently, the subject has attracted considerable attention in consequence of the great relief which patients suffering from this form of dilatation have experienced from the systematic use of the stomach-pump, and from washing out the cavity with Vichy water, as suggested by Dr. Adolf Kussmaul.¹

Even now, however, I think that the physical diagnosis of dilatation of the stomach has hardly been studied with the care that it deserves. It would be a great mistake to suppose that an enlarged stomach differs from the healthy organ simply in occupying a larger part of the abdomen. On the contrary, I believe that a constant feature of these cases is that the organ is greatly displaced downwards; the gastro-hepatic omentum, the lesser curvature, and the cardiac extremity of the stomach, being all much elongated. Hence, instead of the dilated stomach forming a prominence in the epigastrium, that region is more or less deeply hollowed, whilst below the umbilicus one may observe a large rounded tympanitic swelling. Manipulation of this swelling generally gives rise to a very distinct splashing of fluid and air, and which is, perhaps, more marked than when the intestines contain similar matters. And in many cases fluctuation may be detected, which might be mistaken for that caused by an ascites.

But the most distinctive feature of dilatation of the stomach in these cases, and that which enables the exact position of the organ to be most accurately determined, is afforded by the peristaltic movements of its muscular coat. It is remarkable that scarcely any writer on diseases of the stomach alludes to this very valuable diagnostic sign, which, however, has for years past been well known to the students of Guy's Hospital, having been frequently pointed out to them by Sir W. Gull when cases of this kind were admitted into his wards.

As Sir W. Gull remarked to me some time since, medical men often think that by placing the hand under the patient's bed-clothes they can sufficiently well examine his abdomen. It ought to be freely exposed, and the light allowed to fall

¹ "Behandlung der Magenerweiterung durch eine neue Methode mittelst der Magenpumpe," *Deut. Archiv f. Klin. Med.*, vi, p. 455.

obliquely on its surface. A dilated stomach will generally betray its position by visible peristaltic movements, which usually begin near the left costal cartilages, descend below the umbilicus, and after passing over to the right terminate by ascending more or less towards the right hypochondrium. In a case lately under my care a rounded protuberance displayed itself, as large as a foetal head, and appeared to revolve slowly as it followed the course I have indicated. Sometimes, also, faint waves may be seen passing in the opposite direction across the surface of the stomach, due, therefore, to an antiperistalsis. Often, when no contractions are at first visible, they may be induced by manipulating the abdomen rather roughly or by flicking the surface with a cold wet towel. When the contractions are considerable, they may be attended with a rumbling noise, audible at some distance from the patient, and with more or less griping pain. The course taken by their movements, and their position, are probably sufficient to distinguish them from the peristaltic contractions of any other part of the alimentary canal. The movements of the small intestines, so frequently seen in cases of chronic intestinal obstruction, present very different characters; and in the transverse colon direct peristalsis would produce a wave passing from right to left, or in the reverse direction to that which has been described as belonging ordinarily to the gastric contractions. In one instance, indeed, in which all the symptoms pointed to the existence of chronic obstruction of the large intestine, with dilatation of the transverse colon, I observed movement from left to right, which must, therefore, have been due to an antiperistalsis; but the seat of distension was then very different from that met with in cases of dilated stomach, and the sacculi of the bowel appeared to be plainly visible.¹

I have entered into the more detail with regard to the physical diagnosis of what may be termed chronic dilatation of

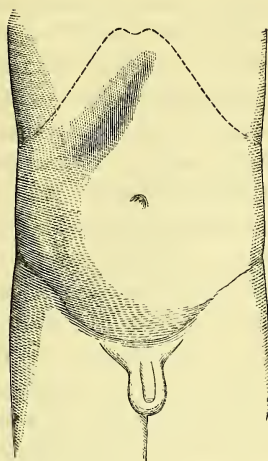
¹ Dr. Brinton, as is well known, denied the occurrence of antiperistaltic contractions of the intestine. But Engelmann has recently observed such contractions in dogs, rabbits, and cats (*Pflüger's Archiv*, 1871, iv, p. 33). Even were Dr. Brinton's views correct, they would not, I presume, be applicable to the stomach, in which organ reverse movements of the contents are believed to occur regularly during digestion.

the stomach, because in some respects I believe them to differ from those belonging to another condition which I am now desirous of describing, and which I may distinguish by the title of acute dilatation. This latter affection is probably very much more rare than the chronic form of the disease, and it has as yet almost escaped the notice of medical writers. Its peculiar symptoms and course will, perhaps, be brought out better by the recital of a case which recently came under my observation than in any other way.

CASE 1.—Acute dilatation of the stomach, with paralysis of its muscular coat, supervening upon a retro-peritoneal abscess communicating with the duodenum; use of the stomach-pump; evacuation of seven pints of fluid; return of the stomach to its natural dimensions and seat; death from exhaustion.

On the 29th of August, 1872, I was asked by Mr. Hooper, of the Blue Anchor Road, to meet him in consultation over a patient who had been suffering for a fortnight from obscure symptoms of abdominal disease. The case was that of a young man about eighteen years old, of tall but spare frame. I found him lying on the outside of the bed, dressed. His countenance was sunken; his eyes bright and glassy, surrounded by deep brown rings of pigment; his breath had a most nauseous sweet odour, perceptible at some little distance.

I made him undress and get into bed, and proceeded to make a careful examination of the abdomen. It was greatly distended, but not uniformly. For while the whole of the lower part of the belly was full and rounded, and the left hypochondrium was equally so, the right hypochondrium was flat, or even slightly hollowed. The separation between the rounded and the flattened regions was indicated by an oblique ridge or line descending downwards and to the right from the upper part of the left hypochondrium; and every time the patient breathed this line could be seen to descend a little, or at any rate to become more distant from the line of the rib-cartilages. The appearance of the abdominal surface may, perhaps, be made more intelligible to the reader by the accompanying diagram, which is copied from one made at the time.



From my observation of other cases in which the stomach has been enlarged, I at once came to the conclusion that the abdominal distension in this case was due to dilatation of the stomach. This conclusion was confirmed by the fact that a splashing sound of fluid mixed with air could be easily produced by manipulation of the lower part of the abdomen. The percussion note over the whole belly was tympanitic, a full sonorous note being obtained. There was no increase of liver dulness.

On inquiring into the history of the patient's illness I learnt that until fourteen days before he had been in his usual health. He was probably not of very good constitution, for his mother had died of phthisis, and he and his brothers and sisters were all spare and delicate-looking. He had been subject to some affection of the throat, probably chronic enlargement of the tonsils. He assured me that he had never suffered from indigestion or pain after food.

On the day when his illness commenced (Thursday, August 15th), he went to work in the morning as usual after his ordinary breakfast of bread and butter. He had some ham for his midday dinner; I could not elicit that this was hard or indigestible. In the afternoon he came home and said that he had felt very poorly all day. He complained of severe pain in the abdomen, and was sick. The next morning (Friday, the 16th) he was again sick; the vomited matters consisted chiefly of ingesta.

After this he remained free from sickness for some days, but the pain in the abdomen continued until Wednesday, the 21st. His father also noticed that his eyes were sunken and dark.

On the 21st the pain ceased, and he remained free from it for two days. He was able to get about the house, and even to walk to Southwark Park, perhaps a third of a mile distant, and to lie on the grass. On the 23rd the pain returned, and lasted till the 26th. But on the 25th he was able to eat boiled mutton, turnips and French beans, for his dinner.

On Monday, the 26th, the pain again left him, and he said he was quite well. On Tuesday, the 27th, it was particularly noticed that he made a fair dinner of boiled mutton. This was the twelfth day from the commencement of his illness. Hitherto his friends had felt no real uneasiness about him. But about 5 p.m. on the 27th all his symptoms returned in such a form as to excite great alarm in his relations' minds. He again complained of severe pain all over the abdomen, and he was very sick. The vomited matters were now of a greenish colour and very offensive, more like fluid fæcal matter than anything else. He also brought up extraordinarily large quantities, a pint coming up at a time, and altogether it was considered that he must have vomited two gallons within the twenty-four hours. The bowels had hitherto shown a tendency to constipation, but on this day (the 27th) they acted nine times. He passed but little urine. The vomiting, after lasting twenty-four hours, ceased entirely, but in all other respects he rapidly got worse up to the time of my visiting him on the 29th. He took not the slightest nourishment, but large quantities of water and a good deal of ice.

In addition to the other symptoms which have already been mentioned as having existed at the time of my visit on the 29th, it may be stated that the pulse was 124, very feeble. The temperature in the axilla was 98·6°. The hands and feet were warm, and had been so through his illness. His tongue was fairly clean. He complained much of thirst, and had frequent eructations of wind. The bowels had acted slightly in the morning; the evacuation was shown to me, and consisted of a scanty unformed mass of dryish fæces.

The opinion which I formed about the case was that, whatever the original disease, his distress was now mainly caused by

dilatation of the stomach; that this organ contained a large quantity of fluid, but was paralysed from over-distension, and unable to rid itself of its burden; that if we could pass a stomach-pump tube and empty the stomach, and afterwards feed the patient by nutrient enemata for a time, it was possible that his life might be saved.

I therefore suggested that he should be moved into the hospital; and his medical attendant, Mr. Hooper, seconded this advice. The patient himself was not unwilling, but his other relations refused their consent in the absence of his father, who had been telegraphed for from Portsmouth, and whose arrival was expected every hour.

We therefore prescribed a mixture containing bismuth, nuxvomica, and a little morphia; and gave directions that he should have nutrient enemata at fixed intervals, and that nothing but a little ice should be given him by mouth.

Early on the morning of the 30th I again visited him, and found that his condition was decidedly worse. He had had no sickness, but the stomach was more distended, the line indicating the margin of the lesser curvature being much higher, or nearer the ensiform cartilage. His pulse had risen in frequency. His friends were most distressed about him, and were fully convinced that unless relieved he could not live through the day.

As permission to move him into the hospital was refused, and as it was indeed very doubtful whether he could bear such a journey, I arranged to visit him again as early as possible in the afternoon, and to make the attempt to give him relief by means of the stomach-pump.

About 2 p.m., therefore, I returned to the house, accompanied by one of the dressers at the hospital, Mr. Maurice Duke. The condition of the patient was not materially altered, and he was perfectly conscious and very desirous that we should carry out the measures we contemplated.

The stomach-pump tube was introduced without any difficulty by Mr. Maurice Duke. Even while it was being passed it provoked the expulsion of a greenish fluid, which gushed out from the mouth by its side and through its open end; and when it had entered the stomach a similar fluid was ejected through the tube with considerable force. When a few ounces had been collected its spontaneous discharge ceased; the stomach-pump

was then fitted to the end of the tube, and each stroke of the piston brought away a full supply of the liquid. After a time this came less freely; a few ounces of slightly tepid water were then injected, and on reversing the action of the pump afterwards it was found that still more fluid could be withdrawn. The same thing was repeated more than once, the water injected on one occasion being quite cold.

The effect of the operation on the contour of the abdomen was most marked. The distension rapidly subsided, and before the stomach-pump tube was withdrawn, the belly had become deeply hollowed. It was thought advisable to apply mechanical pressure, as is done after childbirth and after the operation of paracentesis abdominis; a cloth was therefore folded so as to form a broad pad, this was placed on the flat abdomen, and over it a jack-towel was bound tightly round the body.

The fluid removed was found to measure a gallon and half a pint. This included the water that had been injected, which was estimated to have amounted to a pint and a half. This would leave seven pints as the quantity extracted from the stomach. It was a thin watery liquid, pretty uniform in consistence, depositing a slight granular sediment.

After the removal of the tube the patient said that he felt much relieved, and that his pain was all gone. He turned on to his side of his own accord. His pulse was of about the same frequency as before the operation, but seemed to have more volume.

A pint of beef tea, with a wineglassful of brandy, was now injected per rectum. As he complained much of thirst, his mouth was wetted with a little weak brandy and water, and directions were given that he might have small quantities of ice to suck, but that he was not to have any liquid given him to drink.

About an hour and a half later Mr. M. Duke visited him again, in order to give him a subcutaneous injection of morphia, for it was deemed important to secure sleep, as he had had none for several nights. Mr. Duke found, however, that he was very drowsy, and that it was scarcely possible to get an answer from him. His pulse was 144; his temperature 102.7° . An hour later he quietly died, at 6.30 p.m.

The post-mortem examination was made the day after death by Mr. Maurice Duke, in my presence. The friends felt strong

objections, and consented to the autopsy only in consequence of my urgent representations of its necessity. The exploration was limited to the abdomen, and the organs were examined *in situ*.

The abdomen was found to be slightly less hollow than immediately after the operation on the previous day, but it was not at all distended; it was beginning to turn green from decomposition.

On making a vertical incision the stomach was seen in a natural position; projecting, perhaps, an inch or a little more below the left lobe of the liver. Its outer surface was of the natural colour. It showed no marked excess of vascularity. There was no sign of even commencing inflammation of its serous coat:

Below the stomach various parts of the intestines lay on the surface. The coils of small intestine were, without exception, contracted rather than dilated; the transverse colon also was of moderate size. On the other hand, the cæcum and ascending colon were decidedly distended by gas and fluid, which could be made to produce a splashing sound when these parts of the bowel were disturbed in their position. The ascending colon made a bend downwards before passing up to the hepatic flexure, so that it and the cæcum were much more widely in contact with the parietes than usual, and pushed the ileum and jejunum more towards the left side of the abdomen.

In moving these folds of the ascending colon it was discovered that there was a little patch of lymph at one spot on the peritoneum passing from the large bowel to the mesentery of the small intestine, and a moment later the serous membrane gave way at this spot, and a thin fetid fluid with air exuded. This was found to come from a large cavity situated behind the ascending colon, gall-bladder, and other parts, all of which were fixed together by firm fibrous adhesions of old date.

From the imperfect and hasty character of the examination it was not possible to determine the precise limits nor the origin of this cavity, in which the finger could be moved freely for a considerable space; it probably communicated with the intestines by more than one aperture. There was one very large opening into the duodenum, just where the gut was bending round the head of the pancreas; in fact, a finger passed into the duodenum through the pylorus went straight into the cavity, and it was at first supposed that the whole calibre of the

second portion of the duodenum had sloughed away. Subsequently, it was found that the duodenum passed down on the inner side of the cavity. Besides a considerable quantity of fetid fluid the cavity contained a large-sized slough, some inches long, apparently the remains of a mass of connective tissue. The kidney lay behind the cavity, and was healthy.

Before cutting into the stomach I pulled it down by means of the omentum, and endeavoured to stretch it. I then found that it could easily be drawn down to a very considerable extent; not, indeed, so as to reach the pubes, but so as to come considerably below the umbilicus, and probably half way down between it and the pubes.

The walls of the stomach were of the natural thickness. The pylorus was perfectly free. The gastric mucous membrane was much ecchymosed. The organ contained very little fluid, perhaps half a pint; this was of a green colour, precisely like what had been removed during life. Microscopically it showed a good many masses of sarcinæ, some few with sharp edges and well defined, the majority consisting of rounded indefinite clusters, but still presenting sufficient indications of their nature to enable them to be recognised.

My recognition of the fact that the stomach was dilated in the case just related, and my conviction that this condition might probably be remedied by the employment of the stomach-pump, depended on my recollection of a somewhat similar case that had occurred in the hospital nearly two years before, under the care of Dr. Rees, who has most kindly allowed me to relate it in this paper.

CASE 2.—Acute dilatation of the stomach, fatal after three days' illness; absence of all other disease on post-mortem examination; return of the stomach to its proper size when emptied of its contents, after removal from the body.

William S—, æt. 30, was admitted into Guy's Hospital, under the care of Dr. Rees, December 7th, 1870. He had been in the army for sixteen or seventeen years, and was in receipt of a pension. He had always had good health until January, 1870, when he was attacked with rheumatism. Since that time he

had not been well. He had formerly had syphilis. In August last he was in the hospital under the care of Dr. Habershon, suffering from pain and stiffness in the back.

In the course of the month before his admission he spat a little red blood. This fact and the loss of flesh he had undergone led to his chest being minutely examined, and it was thought that some doubtful signs of pulmonary disease were discovered. Cod-liver oil was prescribed for him.

On December 15th he was taken with sickness, which lasted all night; it was attributed, both by the patient and by the sister of the ward, to the cod-liver oil he was taking. However, the sickness persisted.

On December 17th, when Dr. Rees visited the ward, he was informed that the man had passed no urine for two days. A catheter was passed; but three or four ounces of urine only were drawn off.

On examining the abdomen Dr. Rees found that there was dulness on percussion above the pubes, and he therefore directed that the catheter should be again introduced, but no urine was obtained.

On Sunday morning, December 18th, happening to be in the hospital, I was asked by the house-physician, Dr. de Liefde, to look at this patient, as there was a doubt whether there might not be some mechanical obstruction of the bowels. The sickness still continued. The bowels had been confined for two days, but an injection brought away two fæcal evacuations. The man looked very anxious and distressed. The pulse was feeble, the temperature below the normal.

The abdomen was in no degree distended, but the contrary. The recti muscles were very rigid, especially the upper portions of them, which stood out prominently, with the lineæ transversæ delineated through the integuments. The percussion note was generally tympanitic; but above the pubes, for, perhaps, half the distance between it and the umbilicus, there was dulness. No tumour could be felt resembling in outline a distended bladder. On giving a smart tap to this region, or to any part of the iliac fossa, a loud splashing sound was produced, evidently due to the admixture of fluid and air.

I examined the chest, but could find no decided evidence of disease in any particular region. I was unable to form any

opinion as to the cause of the sickness, or the nature of the abdominal mischief.

His pulse gradually became more and more feeble, and he sank the same afternoon.

I made a post-mortem examination the following day, in the absence of Dr. Moxon.

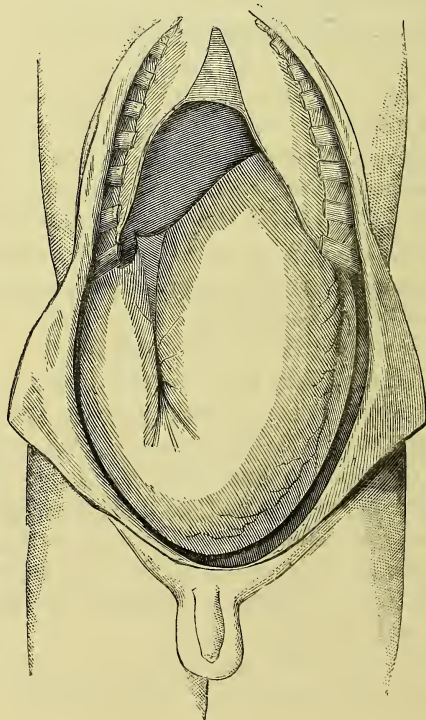
The brain was healthy.

The lungs were very œdematous, especially their upper lobes. The lower parts of both lungs were much softer and more lacerable than natural; but there was no marked hepatization at any point. No tubercle was anywhere found.

The larynx and air-passages were full of frothy fluid.

The heart was healthy; owing to the arched position of the diaphragm, its apex appeared to lie between the fourth and fifth ribs.

When the abdomen was opened the stomach was almost the only organ visible. The accompanying diagram, which has been copied from one made at the time, shows the relations of



the parts. The stomach passed from the under surface of the diaphragm downwards as far as the pubes; an oblique line traced in this direction was found to measure thirteen inches. The organ then bent sharply upwards to reach the under surface of the liver, where the pylorus lay in its natural position; a line traced obliquely upwards from the lower end of the other line at the symphysis pubis measured eight and a half inches. The greater curvature of the stomach thus followed the curve of the abdominal cavity; the lesser curvature was bent sharply on itself at an angle. In this acute angle a hard substance (apparently part of the pancreas) could be felt and seen through the thin gastro-hepatic omentum. The greater omentum lay folded up immediately below the stomach, in the small space between it and the abdominal walls; when drawn out, it reached halfway down to the knees. The transverse colon was empty and contracted, and lay behind and below the stomach; the left part of it was directly in contact with the sigmoid flexure. The small intestine was empty and narrow, so that it was not thicker than a finger; almost the whole of it lay in the pelvis, where its coils were bent and packed closely one upon another, so that they had lost their rounded contour, and looked quite angular. In opening the abdomen the stomach was wounded, and part of the greenish-brown fluid which it contained escaped into the abdominal cavity. Consequently, the organ was comparatively flaccid, when I saw it: but the state of the small intestine shows that it must previously have been very tense and have exerted great pressure on the surrounding parts.

The liver was pushed upwards beneath the ribs. It was healthy, as was also the gall-bladder. The right supra-renal capsule was natural in appearance. The left capsule was destroyed in removal. The spleen was small and firm. The kidneys were healthy. The bladder was contracted behind the pubes.¹

¹ I cannot refrain from one observation as to the difficulty which arose in this case in determining whether the bladder was or was not distended. For, only a month before, I had been placed in a very similar difficulty in respect to a case of intestinal obstruction. A man was admitted into Guy's Hospital under the care of Dr. Wilks, suffering from obstruction of the bowels. The constipation had lasted eight days, but he said that the motions had previously been narrow. He had had comparatively little sickness, and the vomiting had never been stercoraceous. He had passed no water since the day before. Above the pubes, half

Thus, no disease was found in the body to which the death of the patient could be attributed, except the dilatation of the stomach. And, next to the fact of the extreme degree of this dilatation, the most remarkable feature of the case was the circumstance that when the organ was removed from the body it was found to have resumed nearly its normal size. When allowed to fall, as nearly as possible, into its natural curve, the length of the organ, from the convexity of its fundus to the pylorus, was found to measure eleven inches. The only sign of the distension which remained consisted in the presence of a number of fine white striæ, visible on its serous surface, and apparently analogous to the well-known *lineæ gravidarum*. The mucous membrane had fallen into folds, presenting the usual reticulated arrangement. It showed a finely punctated ecchymosis at some points. Near the lesser curvature were some white points, apparently solitary glands. The muscular coats of the stomach were well marked, per-

way up to the umbilicus, there was dulness on percussion, and it was believed that the rounded outline of the bladder could distinctly be felt.

Although the patient's general condition was one of marked collapse, it was thought that the balance of probability was in favour of the original cause of the obstruction being some chronic stricture of the large intestine. No doubt was entertained as to the presence of a considerable quantity of fluid in the bladder, although it was surmised that the collapsed state of the patient might have diminished the secretion of urine and prevented its further accumulation. A catheter had been passed when the man was first admitted, but only a few drops of urine were obtained. When I saw him, late in the evening, instruments were again passed, both by the house-surgeon and by Mr. Howse. No urine was obtained. It was determined to watch the patient's condition for two hours, and at the end of that time to consider the propriety of puncturing the bladder. In the mean time the patient died. On post-mortem examination the cause of the obstruction was discovered to be the appendix vermiformis, adherent at its extremity, strangulating a coil of small intestine which descended into the pelvis. This coil lay in the recto-vesical pouch, and had dilated it into a rounded cavity. The bladder (which was quite empty) was thus pressed forward behind the pubes; and it is probable that the prostate may have been pushed downwards, and that its displacement may have given rise to the opinion of the surgeons that the catheters had not entered the bladder. It was certain that at least one instrument must have been introduced into its interior, for its mucous membrane exhibited a distinct linear ecchymosed laceration near the exit of the urethra.

The dulness above the pubes and the apparent vesical tumour were due simply to the presence of some fluid in two or three coils of small intestine which lay in that position.

haps rather thicker than natural. The pylorus was of its normal diameter, and contained a decided muscular ring, but presented no sign of disease.

So far as my reading has gone, such cases as those above related are exceedingly rare. The nearest approach to them that I have met with is a case recorded in the fourth volume of the 'Path. Trans.,' by Dr. Miller and Mr. Humby, of which the following is a brief abstract :

Mrs. M—, æt. 48, was seized with vomiting, which continued the whole of the night of March 6th, 1853. The fluid ejected amounted to as much as five handbasins-ful. The next morning she was faint and weak, the pulse not above forty in the minute and intermitting. The abdomen was lax and soft, without pain on pressure. She had recently been under medical care for piles and prolapse of the rectum. She had been getting thin recently, and her daughter had observed a slight increase in the size of the abdomen. On the 8th the vomitings had somewhat diminished ; the abdomen was sunk and depressed ; little gurgling was heard in the region of the stomach. On the following day the vomiting had subsided, but the patient appeared more depressed and ill. The bowels were relieved by means of an injection. On the 10th the severe vomiting ceased. A considerable swelling of the whole abdomen was now discovered, commencing about the left iliac region, *except that part on the right side of a line drawn from the ensiform cartilage to the right superior spinous process of the ilium.* *The swelling was tympanitic.*

On the 11th the swelling, instead of being tympanitic, was dull on percussion, and fluctuated ; the patient experienced an inclination to vomit when pressure was made over it. For the next three days she continued in the same state, the abdominal tumour being larger and fluctuating ; the general symptoms were those of exhaustion, but with complete absence of pain, sickness, or natural action of the bowels.

On the 14th Dr. (Sir Thos.) Watson saw her, who expressed an opinion as to the difficulty in forming a correct diagnosis of the case, but believed it to be one of preternaturally distended stomach containing fluid, and that there probably existed some

mechanical obstruction of the bowels. On the following day she became delirious at times. On the 16th Dr. Bright saw her, who did not come to the same conclusion as to the nature of the case as Dr. Watson. On the 17th she expired.

Mr. Humby examined the body. The viscera of the abdomen were found to be healthy; but the stomach, distended to an enormous size, occupied the whole site of the abdominal tumour.

A woodcut which accompanies the record of the case in the 'Path. Trans.' shows the stomach filling the whole abdomen, below and to the left of the line referred to above as passing from the ensiform cartilage to the right crista ilii. In many places the muscular fibres of the stomach had completely given way, so that the mucous and peritoneal coats were approximated. The cavity of the stomach was capable of holding ten and a half pints of fluid. The small intestines were contracted to a very small size, and completely pushed down into the cavity of the pelvis.

The fluid rejected from the stomach was found to contain abundant specimens of the *Sarcina ventriculi*.

It will be granted, I think, that there is a close general similarity between the case I have just quoted from the 'Pathological Transactions' and those which form the subject of this paper. Taken together, they show that dilatation of the stomach may be attended with symptoms of great severity, of sudden onset, and leading within a few days to a fatal termination.

A disease so rapid in its course may, I think, be fairly termed "acute," by way of distinguishing it from the chronic dilatation that is a sequel to obstructive disease of the pylorus, or that may sometimes occur independently, as in Andral's case quoted in the first page of this paper. But it can hardly be supposed that the dilatation itself is so rapid in its development as its symptoms are sudden. In this respect Mr. Humby's case is very instructive, in which the patient's daughter had observed a slight increase in the size of the abdomen for some time before the sudden attack of profuse vomiting, which first led her medical attendant to suspect the existence of abdominal mischief.

The physical characters of acute and of chronic dilatation of the stomach appear to differ in some important respects. In

both the lower part of the abdomen is occupied by a rounded tumour, in which gas and fluid exist, and may be made to produce a splashing sound by manipulation. But, whereas in chronic dilatation the left hypochondrium is generally hollowed, in acute dilatation it is as full as the hypogastric region itself. This appears to depend on the different degrees of distension in the two cases. In chronic dilatation the stomach is a large loose bag, only partially filled, which naturally bulges most at its lower part. In acute dilatation the organ is as tense as it can possibly be.

Again, visible peristaltic movements afford important aid in the diagnosis of chronic dilatation of the stomach. In the acute form of the disease they have not yet been observed. And I think it is probable that in the latter case the contractions of the organ would be too feeble to be seen through the abdominal parietes, the muscular fibres being extremely attenuated, whereas in chronic dilatation they are often greatly thickened and hypertrophied. The distinction would be parallel to that which I have pointed out in a former volume of these Reports as obtaining in the several forms of intestinal obstruction, so far as visible peristalsis of the intestine is concerned.

The vomiting in cases of acute dilatation may probably at first present nothing to distinguish it from that which occurs under a variety of other conditions, or the quantity of fluid discharged from the stomach may within a few hours be so great as to arrest attention. In the latter case the cavity may be so completely emptied that for a time the abdomen may regain its natural appearance, and no sign of gastric enlargement be left. If under such circumstances the patient should be absolutely forbidden to eat or drink, and if nutrient enemata should be used to maintain life for a few days, it may, perhaps, be hoped that the stomach would regain its tone. But when solid and liquid food are freely permitted, the dilatation and distension soon return, and with them the tendency to vomit.

After a time, however, the vomiting in most cases ceases. The cause of this appears to be that the muscular coat of the organ is paralysed. Like a distended urinary bladder, it is unable to empty itself, and it continues rapidly to increase in size. In Dr. Rees's case, indeed, the sickness continued to the last. But I think that it is probable that in this instance

vomiting was effected not by the walls of the stomach, but entirely by the abdominal muscles. For I noticed particularly that the walls of the abdomen were exceedingly rigid, the recti muscles, with their lineæ transversæ, being plainly seen through the integuments.

The appearance of the vomited matters is mentioned in only one of the cases. They consisted of a thin greenish-brown liquid, very offensive, very like that which is discharged in the earlier part of the course of a case of intestinal obstruction, and, no doubt, containing bile and other matters derived from the upper part of the small intestine. There was no frothy scum, such as is seen in cases of chronic dilatation, when sarcinæ are very abundantly developed. But it is nevertheless noticeable that in two of the cases sarcinæ were discovered in greater or less number. In both these instances the stomach was found to be ecchymosed, a fact of some interest as bearing upon the opinion lately advanced, that, instead of being vegetable organisms, sarcinæ arise from aggregations of red blood-discs.

The following conclusions appear to me to be fairly deducible from the cases above related:—

1. Acute dilatation of the stomach may arise in young subjects, in whom that organ has previously been apparently healthy. The actual process of enlargement is probably more or less gradual; but it at first produces no symptoms, and when these occur they are sudden in their onset, and of great severity, and may destroy life in a few days.

Acute dilatation of the stomach may be the only disease found in the body after death, or it may have supervened upon some other morbid change in the alimentary canal.

2. Its signs are (1) a rapidly increasing distension of the abdomen, which is unsymmetrical, the left hypochondrium being full, while the right hypochondrium is comparatively flattened; (2) the existence of a surface-marking descending obliquely towards the umbilicus from the left hypochondrium, and corresponding with the dropped-down lesser curvature of the stomach, this line appearing to descend with each act of inspiration. (3) The presence of fluctuation in the lower part of the abdomen. (4) The occurrence of splashing when the dis-

tended part of the abdomen is manipulated. (5) The presence of an uniformly tympanitic note over a large part of the distended region when the patient lies flat on his back. Above the pubes, on the other hand, there may be dulness on percussion simulating that of a distended bladder.

If the abdominal walls be very rigid, and the recti muscles prominent, the characters numbered under (1) and (2) may be absent, but those numbered (3) and (4) remain. If the patient have recently vomited a very large quantity of liquid, all the physical characters of dilatation of the stomach may probably for the time disappear.

3. Its symptoms are those of severe abdominal disease, without evidence of peritonitis or lesion of the intestines. The eyes are sunken and surrounded by brown rings; the features pinched and drawn; the breath has a nauseous odour. There is very profuse vomiting, so that several quarts may be evacuated in the twenty-four hours. After a time, however, vomiting may cease entirely, the stomach being paralysed, and unable to get rid of its contents. There is no absolute constipation, although the bowels may be more or less confined. The urine is very scanty.

4. The stomach may be so greatly dilated that when the abdomen is opened after death it is the only organ visible, or that has been in contact with the anterior abdominal wall below the liver. Yet after its removal from the body, and the letting out of its contents, the stomach may shrink back to its natural size, and the only remaining indication that it had undergone such extreme distension may be the presence of slight lacerations of its coats.

5. If acute dilatation of the stomach be recognised during life, and the stomach-pump be employed, its contents may be almost completely evacuated. The organ then quickly returns to its natural size and position. The pain and distress suffered by the patient may by this procedure be entirely removed, and there is reason to hope that it may save the life of the patient, provided always that the general symptoms be not already too severe, and that there be no other disease to which he must necessarily succumb.

Since this paper was written, my friend Dr. Hartree has

pointed out to me that Dr. Hughes Bennett has recorded in his 'Principles and Practice of Medicine' a case somewhat similar to mine. The case comes under "Diseases of the Respiratory System," because the patient suffered from empyema, and it had thus escaped my notice. I append an extract from Dr. Bennett's report :

"Allan B—, æt. 26, a gilder, admitted November 26th, 1856.

"December 13th.—Last night about 11 o'clock he was seized with severe pain in the upper part of the abdomen, which prevented him from sleeping. This morning the pain still continues; it is increased by firm pressure, but he can easily bear slight pressure. Respiration is abdominal as well as thoracic. Appetite gone; bowels opened freely a few hours ago; dejections natural. Pulse 108, small, but not hard or strong. Skin hot; the look is not particularly anxious.

"15th.—Continues to complain of abdominal pain. Yesterday four loose stools were passed, which produced considerable uneasiness. To-day he has had but one stool. There is considerable tenderness on pressure, and distension from tympanitis over the whole left flank. Pulse 96, feeble, soft.

"16th.—He was greatly relieved, and he continued in a comfortable condition till the 18th. On the evening of that day he was attacked by vomiting and a sensation of fulness in the abdomen, both of which he believed to be due to his having taken a quantity of lemonade. The vomiting continued till 11 p.m., when it ceased. The matters vomited were partly fluid and partly solid, and evidently consisted of alimentary substances. Tenderness on pressure in the region of the recti muscles; bowels opened this morning; dejections natural. Respirations 30, somewhat laboured; pulse 120, small, somewhat hard, but quite compressible; consciousness perfect; skin hot and dry, cheek flushed.

"19th.—A remission of the symptoms took place. On the 20th vomiting recurred, together with abdominal pain and tenderness, as described in the report of the 18th. These continued to become severe till the morning of the 22nd, when he sunk, with all the marks of great depression of the entire system. He died at 2 a.m. on the 22nd."

On post-mortem examination, twenty-eight hours after death, it was found that "the stomach was enormously dilated, extending to the pubes, and concealing all the abdominal viscera, except a portion of the right lobe of the liver and colon. On opening it it was found to be distended with air, and somewhat twisted round on itself at the junction of the cardia and œsophagus. All the coats were very thin, apparently from the distension. The mucous coat was healthy, and no abrasions could be discovered in it. But between the serous and muscular, as well as between the muscular and mucous coats, numerous bullæ of air were visible, which could be moved about by pressure of the fingers, evidently dependent on the presence of some gas in the texture, which was in no way putrid, nor was the gas of fœtid odour."

The following extract is from Dr. Bennett's commentary on the case :

"The mode of death in this case was very remarkable, and, indeed, so far as I am aware, unique. The man, to relieve his thirst, was allowed two or three bottles of effervescing lemonade as drink during the day. It would appear that on the 15th of December he complained of fulness of the stomach and tympanitic distension of the abdomen, which symptoms, however, excited no great attention, although they may have originated in the same cause which apparently produced the more violent complaint that came on subsequently. On the evening of the 18th he was seized suddenly with all the symptoms of perforation of the bowel, and on examining him next day such was what I believed to have occurred. There was great abdominal tympanitic swelling, excessive pain, vomiting, &c. But on dissection we found that these symptoms depended upon great distension of the stomach, with emphysema of its coats, the latter a lesion which I believe was then observed for the first time. It was not caused by putrefaction, and the question arose, How was it produced? It turned out, on inquiry from the nurse and neighbouring patients, that the man had kept his bottles of effervescing lemonade till the evening, and drank at least the contents of two of them in quick succession. It is probable, therefore, that the exhalation of gas had distended the stomach, and caused it to twist round partly on itself at the cardia, so as to prevent its escape. Hence the distension and

pain, and why, probably, the contained air, not finding a ready exit through either the cardia or pylorus, had forced its way between the coats of the organ itself.”

I confess that I should be disposed to leave the origin of the distension unexplained, or to refer it to the same unknown cause as that which operated in the cases related in the present communication, rather than to suppose that gas sufficient to dilate the stomach so greatly could be generated by two or three bottles of lemonade.

